

new metal and red cobalt chloride, which possesses all the properties of green nickel chloride, which has thus been decomposed into a red and a colourless salt.

NOTES.

THE Royal Society has recently entirely recast the regulations under which the Government fund of £4000 for the promotion of scientific research is administered.

MR. COMMON'S 5-foot telescope is now completed, and photographs of the moon and nebulae have already been taken to test the figure of the silver-on-glass speculum. We hear the results are quite satisfactory. Congress is to be asked to vote 250,000 dollars for the purchase of a refractor of the same dimensions for the Washington Observatory.

MR. ISAAC ROBERTS, working on the lines laid down by Mr. Common, has recently, by exposures of over four hours, obtained most important additions to our knowledge of the nebulae of Orion, Andromeda, and the Pleiades.

WE believe that the Royal Astronomical Society has this year awarded its medal to M. Lœwy, of the Paris Observatory.

PROF. CORFIELD has been elected an Honorary Member, and Dr. Louis Parkes a Foreign Associate, of the Société Française d'Hygiène.

LAST week's number of the *Electrician* contains a notice of the work of Sir William Thomson, accompanied by an admirable steel engraving.

THE new Laboratory at the Normal School of Science, built for the accommodation of the students in the practical courses in physics and astronomical physics, is now finished. It accommodates about eighty students.

THE Medals and Funds to be given at the anniversary meeting of the Geological Society on February 15 have been awarded by the Council as follows: the Wollaston Medal to Prof. T. G. Bonney, D.Sc., F.R.S.; the Murchison Medal to Prof. James Geikie, F.R.S.; the Lyell Medal to Prof. W. Boyd Dawkins, F.R.S.; and the Bigsby Medal to Mr. J. J. Harris Teall; the balance of the Wollaston Fund to Mr. A. Smith Woodward, of the British Museum; that of the Murchison Fund to Mr. Grenville A. J. Cole, of the Science Schools, South Kensington; and that of the Lyell Fund to M. L. Dollo, of the Royal Museum at Brussels.

AT the last meeting of the Mineralogical Society, there was described a new mineral species, an oxychloride of lead, to which the name of "daviesite" was assigned. This mineral was found as very minute crystals in a specimen from Sierra Gorda in Bolivia. The crystals are very rich in faces, and belong to the ortho-rhombic system; their parametral ratios are $a : b : c = 1.2594 : 1 : 0.6018$; they are elongated in the direction of the vertical axis, parallel to which there are faces of the prism (110) and the pinacoid (100), and they are terminated sometimes by a simple basal plane (001), sometimes by the domes (011), (031), (101), (301), (501), and the pyramids (211), (121), (221), (521). The optic axes are visible when the basal plane is normal to the axis of the convergent polarized light.

THE Scientific Department of the Scotch Fishery Board, in view of the approaching great spawning period of the marine food-fishes, have begun a series of systematic investigations at some of the more important fishing-grounds lying off the east coast of Scotland. From a report presented to the Fishery Board by Prof. Ewart, it appears that one of the Board's naturalists (Mr. T. Scott) has recently made some interesting observations on board the large steam-trawler *Southesk*, of Montrose, as to the spawning of the plaice (*Pleuronectes*

platessa) at Smith Bank, a well-known ground in 20 fathoms of water, lying off the Caithness coast, where operations were carried on for several days. A great variety of fish were obtained; but, except a few gurnards, only the plaice, which were present in great numbers, were spawning. Specimens both quite ripe and partly spent were captured by the trawl, while the tow-net revealed the presence of countless multitudes of floating eggs on the surface—in all stages of development—as many as 10,000 being obtained in one haul. These were shown to be almost entirely the ova of plaice, the remainder being the ova of the gurnard. Such an opportunity of witnessing the spawning of a shoal of flatfish on so gigantic a scale, and of proving so clearly the relationship between the spawning fish and the pelagic ova, does not often occur.

A BOTANICAL STATION was established early last year at St. Lucia on the most unpretentious footing. A Committee appointed to supervise the work of the Curator, Mr. John Gray, reports that, "considering the difficulties incidental to the starting of such an undertaking, the peculiar nature of the ground, and the limited funds available for the purpose, the work thus accomplished is satisfactory." The Committee says that the most encouraging feature of Mr. Gray's report is the general appreciation shown by the agriculturists of the district in the success of the Station, as shown by their increasing disposition to seek advice from the Curator, and to try and obtain seeds from him. Already the demand for cocoa, coffee, and nutmeg plants is so great that additional land will have to be acquired for the extension of the Garden.

LORD WOLSELEY, who is not often caught tripping in making hasty statements, writes as follows in the current number of the *Fortnightly Review*:—"The battles of the future will be very different from even those of 1870. . . . One remarkable change will be the absence of nearly all that terrific noise which the discharge of five or six hundred field guns, and the roar of musketry caused in all great battles. . . . The sound of cannon will be slight, and will no longer indicate to distant troops where their comrades are engaged, or the point on which they should consequently march. Our sentries and advanced posts can no longer alarm the main body upon the approach of the enemy by the discharge of their rifles. The camp or bivouac will no longer be disturbed at night by the spluttering fire of picquets in contact with the enemy. Different arrangements for giving the alarm upon the approach of hostile columns will have to be resorted to. The main column on the march cannot in future be warned, by the shots of flanking parties, of the enemy's proximity, and a battle might possibly be raging within a few miles of it without that fact becoming at once apparent." Will some competent member of the "Scientific Corps" kindly explain, or are they all in civil employ?

WE make the following extract from a letter addressed by Mr. A. W. Tuer to a contemporary:—"The melodious hum of skating was perhaps never heard to greater advantage than through the crisp air of a bitterly cold morning little more than a fortnight ago—the first Sunday in the year. Almost as soon as Kensington Gardens were entered, one became conscious of a clearly-defined musical sound coming from the direction of the Round Pond—G as nearly as I could judge, but corrected to G sharp, when, half an hour later, I got to a piano. I had wished to compare the notes—probably lower—given forth by other and larger sheets of ice, but procrastination strangled an opportunity which perhaps others will take when it again offers. Comparing a sheet of ice to a taut string, and the countless skates to the hairs of a bow—scientifically, a poor comparison enough—the sound might be expected to have been like that produced by the scraping of a fiddle, but it exactly resembled the whistle of a distant locomotive."

PROF. J. H. GORE, of the Columbian University, has in preparation a bibliography of geodesy. During two trips to Europe he has collected about seven thousand titles, having examined nearly every large library except that at St. Petersburg. He begins with the first effort to ascertain the shape of the earth by triangulation in the seventeenth century. The work will be published soon by the Coast Survey. Prof. Gore is trying to make his service complete by personal application for data, he having written to all astronomers and other mathematicians in the world whose addresses he could obtain.

THE American Society of Naturalists (*Science* reports) held in Baltimore, on December 27 and 28, one of its largest and most successful meetings. Methods of instructing large classes in botany were presented by Profs. Goodale and Wilson, and in geology by Profs. Niles and Williams. The Society fully approved the excellent work of its committee on education, in paving the way for better instruction in the natural sciences in all grades of schools, especially the lower ones. Mr. J. E. Wolff showed a photographic method of class illustration, and Prof. W. M. Davis explained a most interesting series of paper models, illustrating the development of certain topographic forms and their relation to base-levels of erosion. The Society is composed largely of teachers, and desires to so arrange its meeting next year that the members may be able to attend the meetings of specialists held about the same time.

WE referred recently to the investigations in the Torres Straits of Prof. A. C. Haddon, of the Royal College of Science, Dublin. The *Ceylon Observer* now publishes extracts from some later letters from Prof. Haddon, from which it appears that he was anxious to spend some time in Ceylon, to work out the life-history of the Ceylon turtle and to add to his collections; but it is unlikely that he will be able to do more than call at Colombo on his way home. Writing in November from Thursday Island, Prof. Haddon says:—"I have now been out nearly three months, and have had a very pleasant time, and have seen and learnt much. I find that the anthropology is an untouched field, absolutely so as regards the manners and customs of the past, and I have taken some trouble and a great deal of interest in collecting what information I can in the short time at my disposal. In most of the islands the people are dying off; the younger men know nothing of the life of their forefathers, and there are but few old men left. In a few years' time it will be too late, so I have deemed it desirable to turn some of my attention to that subject, although I had no intention of so doing when I started. Experts at home must judge whether my information is of value. I have had a little peep at New Guinea for a few hours—Mowat—to this end. In April and May I am going to the Louisiades, Sudest and other islands of the south-east end, and also to Port Moresby and Motu-Motu. Mr. Chalmers strongly urged me to give an extra month to that end of New Guinea, promising to take me about, an opportunity which money could not purchase, and which falls to the lot of very few. So I shall conclude my stay in this part of the world with a good look at New Guinea under the best of guidance. It has been a great grief to me that I could not manage Ceylon as well, but I feel I have done quite right in not yielding to the strong temptation."

EXPERIMENTS have recently been made (says *Science*) showing in what order a fatigued eye recovers the power of perceiving different colours. The important factor is what colour has been used to induce fatigue. If the eye has been fatigued by long exposure to red, the sensitiveness for green is the first to reappear, then for blue, then yellow, and finally red. After a "blue-fatigue," the order is yellow, red, green, blue; after a "green-fatigue," the order of recovery is red, blue yellow, green; after "yellow-fatigue," it is red, blue, green, yellow. The eye recovers last the perception of the colour by which the fatigue has been

induced, and first recovers the sensitiveness for the complementary colour. The fatigue is in the retina, for it is an independent phenomenon in the two eyes. The point of finest vision, the fovea, requires a longer time to recover from colour-fatigue than the less sensitive lateral portions of the retina. The physiological process is considered to be related to the visual purple of the rods and cones. On the sense of taste, the same journal states that in the case of a patient whose entire tongue, including the large circumvallate taste-papillæ at the root of the tongue, had been removed, it was found that some power of taste remained. The sensations of sweet, bitter, and sour could be obtained by applying appropriate substances to the back of the pharynx or the stump of the tongue, though if applied to the tongue the taste was apparent only during swallowing. The taste of salt was not perceived. Though these results are not fully in harmony with previous experiments, they are helpful in localizing the tasting-powers of various portions of the mouth cavity.

THE Indian papers report that a severe earthquake, lasting about four seconds, followed by slight momentary shocks at intervals, occurred at Quetta on the morning of December 28. The shocks were felt at intervals till December 31. No injury, beyond the destruction of a few native shops and bazaars, is reported.

TURKESTAN has again been the scene of earthquakes. On November 28 last, at 11.40 a.m., a shock of earthquake, much stronger than any lately experienced, was felt at Tashkent. After a feeble earth tremor, which lasted for four or five seconds, there was a violent shock; the houses cracked, windows rattled, and the inhabitants rushed into the street. The wave of the earthquake came from the east, and at Khojent some houses were damaged.

PROF. MUSHKETOFF has made a gift to the Russian Geographical Society of a very interesting album of 175 photographs, showing the effects of the last great earthquake at Vyernyi. It illustrates with perfect accuracy, the damage done in the houses, as also several geological changes due to the earthquake.

A MEMBER of the Astrakhan Scientific Society has been taking photographs of fishermen at work at the mouth of the Volga, and of the implements used by them. An album of 200 photographs gives a complete representation of the present state of these important fisheries, and a copy is to be deposited at the St. Petersburg Academy of Sciences.

IN December last, a Chinese scientific expedition, under the learned functionary Miao, arrived at Irkutsk.

At a recent meeting of the Geological Society of Stockholm, Dr. N. O. Holst exhibited the forehead and part of the leg of the skeleton of a bison found in a bog near Vadstena. The discovery was made by a farmer as far back as 1865, but it has only recently been proved that the parts are those of a bison. Only two similar discoveries have been made in Sweden, viz. in the province of Scania. Baron de Geer maintained that recent careful researches disproved the theory held by some that a sound had in prehistoric times separated Scania from the rest of Sweden, and thus prevented the immigration of the bison thither.

IN a recent British Consular Report on the Agriculture of the Department of the Maritime Alps, Consul Harris says that the reckless destruction of the forests had already considerably altered the climate and other conditions of that region in the first half of this century, and had caused a large portion of the soil, or the "flesh of the mountains," as Elisee Reclus calls it, to disappear from the summits, which are now only the most barren slopes. When the snows of winter melt off the higher mountains, devastating floods are very common, and the population has, within the past twenty years, decreased very

much on account of these floods. It has been calculated that in one year alone the amount of soil carried down by the two rivers, the Loup and the Paillon, was sufficient to have covered the whole department to a depth of 6 centimetres. The Consul adds that, though something has been done to encourage replanting, a more serious effort than has yet been made is needed to reafforest the country.

FROM a recent British Consular Report on the trade of Maranhão, it appears that a large number of india-rubber producing trees were discovered last year in the district of Pinheiro. The principal traders, who were suffering severely from the depression in the sugar and cotton industries, formed themselves into a company to work up the new discovery, but up to the present the trees have produced little.

THE *Ceylon Observer*, commenting on the destruction wrought by the scaly insect on the cocoa-nut palm in the West Indies, says that it is most remarkable that in Ceylon the palm has been absolutely free from this and other such pests. This fact perhaps is due to the absence of those long-continued droughts which have so grievously affected Jamaica and its neighbouring islands. While the palm, however, has flourished so well in Ceylon, the coffee-plant is almost extinct in the island, a few isolated fields in each district being all that have survived the ravages of the green scale insect. Frequently the finest coffee-trees, with fresh and vigorous-looking bushes, and with stems as thick as a man's thigh, are so completely under the influence of the pest that no crop is produced. Experiments with soap, lime, kerosene oil, &c., have up to the present produced no satisfactory results. Tea seems to flourish where the coffee-plant dies, and even where the tea plantations are attacked by fungoid or insect pests, the plants can be pruned down till not a leaf is left; or, if the attack is a very severe one, the tea-garden can be burnt to the ground without suffering any permanent injury, for the roots and stems in a very few months again display their luxuriance as richly as before.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus* ♂) from West Africa, presented by Mr. Lishman; a Serval (*Felis serval*) from Malindi, East Africa, presented by Mr. H. C. Hunter; a Common Fox (*Canis vulpes* ♂), British, presented by Mr. E. Baldwin Cashel; a Common Fox (*Canis vulpes* ♀), British, presented by Lieutenant H. F. Sparrow, "The Buffs"; a Chough (*Pyrrhocorax graculus*) from Ireland, presented by Mr. A. Mudge; a Gold Pheasant (*Thaumalea picta* ♂), a Silver Pheasant (*Euplocamus nycthemerus* ♂) from China, presented by Mrs. Theodore Lloyd; a Sharp-nosed Crocodile (*Crocodilus acutus*) from the West Indies, received in exchange.

OUR ASTRONOMICAL COLUMN.

ROUSDON OBSERVATORY, LYME REGIS.—The observations at Mr. Peek's private observatory have been carried on during the past year. 163 nights were available for observations, as compared with 165 in 1887. As last year, the attention of the observers has been chiefly directed to transit-observations for time, and to observations of variables of long period. The object of the observations of variables is to determine the exact dates of maxima and minima, and, as far as possible, the light-curve of each star. The list of stars under examination is gradually being revised, circumpolar stars being substituted for those withdrawn, in order that uninterrupted observations may be made throughout the year. Owing to the lengths of the periods of the stars taken, the complete observations are not yet ready for publication. The importance of these light-curves cannot be over-estimated, as they will undoubtedly throw much light on the origin of the variability.

A sidereal clock, by Grubb, has been added to the equipment of the observatory.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 FEBRUARY 3-9.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on February 3

Sun rises, 7h. 36m.; souths, 12h. 14m. 7'4s.; sets, 16h. 52m.; right asc. on meridian, 21h. 9'6m.; decl. 16° 22' S. Sidereal Time at Sunset, 1h. 48m.

Moon (at First Quarter February 7, 21h.) rises, 9h. 25m.; souths, 14h. 58m.; sets, 20h. 43m.; right asc. on meridian, 23h. 54'3m.; decl. 5° 49' S.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h.	m.	h.	m.	h.	m.	h.	m.
Mercury...	8	3	13	19	18	35	22	14'9 ... 9 24 S.
Venus....	9	0	15	7	21	14	0	3'3 ... 0 40 N.
Mars.....	8	47	14	26	20	5	23	22'3 ... 4 51 S.
Jupiter....	5	8	9	3	12	58	17	57'8 ... 23 6 S.
Saturn....	16	53*	0	26	7	59	9	19'7 ... 16 48 N.
Uranus...	23	5*	4	28	9	51	13	22'1 ... 7 58 S.
Neptune..	11	11	18	54	2	37*	3	50'8 ... 18 25 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Feb.	h.	
3	20	Venus in conjunction with and 5° 37' north of the Moon.
5	12	Saturn in opposition to the Sun, southing at midnight.
5	12	Mercury stationary.
8	16	Neptune stationary.

Variable Stars.

Star.	R.A.		Decl.			h.	m.
	h.	m.					
U Cephei ...	0	52'5	81	17' N.	Feb.	7	19 50 m
Algol ...	3	1'0	40	32' N.	"	8	4 10 m
λ Tauri...	3	54'6	12	11' N.	"	5	21 55 m
R Canis Majoris...	7	14'5	16	11' N.	"	6	21 16 m
and at intervals of 27 16							
W Virginis ...	13	20'3	2	48' S.	Feb.	9	5 0 m
S Virginis ...	13	27'2	6	38' S.	"	9	5 M
U Coronæ ...	15	13'7	32	3' N.	"	7	22 52 m
R Draconis ...	16	32'4	66	59' N.	"	5	m
T Vulpeculæ ...	20	46'8	27	50' N.	"	7	19 0 m
Y Cygni ...	20	47'6	34	14' N.	"	8	21 0 M
and at intervals of 36 0							

M signifies maximum; m minimum.

Meteor-Showers.

R.A. Decl.

Near η Aurigæ ...	74	42' N.
,, λ Draconis ...	168	71' N.
,, θ Draconis ...	240	61' N.

February 6.

GEOGRAPHICAL NOTES.

THE paper read at Monday's meeting of the Royal Geographical Society was on the Gran Chaco of the Argentine Republic and its rivers, by Captain John Page, of the Argentine Navy. The Gran Chaco, Captain Page said, is a vast central tract of country lying between the southern tropic and 29° S. lat., bounded on the north by Brazil and Bolivia, on the south by the Argentine province of Santa Fé, on the east by the Paraná and Paraguay Rivers, and on the west by Santiago del Estero and Salta. It contains about 180,000 square miles, or considerably more than the superficies of Great Britain and Ireland. About one-third part of this vast area belongs to Paraguay. The Gran Chaco has been called, particularly in allusion to the low-lying Paraguay section, the *ocean firme*, or solid ocean. This section and the central section of the Argentine rise from the Paraguay River towards Bolivia almost imperceptibly, having numerous and very extensive marshes and jungle, which are drained by many small streams likely to become, as the country progresses, important local waterways. The monotonous level of these sections is relieved by various prominent points of great beauty along the Paraguay River. Both are well wooded, although the predominating woodland